

Date: Tue, 19 Jul 94 04:30:28 PDT
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V94 #201
To: Ham-Homebrew

Ham-Homebrew Digest Tue, 19 Jul 94 Volume 94 : Issue 201

Today's Topics:

 a High Dymnic range Mixer (2 msgs)
 Dummy Load Oil (3 msgs)
 J-Pole Antenna
 JOHANSON TRIMMERS?
 Kenwood TR2500 mods
 QRP Mail List (was: Building an HW-9: HALP!)
 reply to N6MHG
 reply to several
 Rolling my own Transformer (LONG)

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: 18 Jul 1994 18:28:05 -0400
From: newstf01.cr1.aol.com!search01.news.aol.com!not-for-mail@uunet.uu.net
Subject: a High Dymnic range Mixer
To: ham-homebrew@ucsd.edu

In my origional post I said I wanted any information of IC mixers
that would be good for use on the HF bands with a preamp.
(That was I stupid request!!!! On the HF bands Dynamic range is more
important
than noise figure!!!! so no preamp.)
That was a typo I ment with out a preamp. Like the block diagram in the
QST recieveier article.

Has anyone used the new mixer from analog devices?

It has a SSB noise figure of 20dB and a dynamic range of 100+ dB
Is this noise figure of 20dB Good enough for 10 and 15M?

Also how do you convert from or between noise figures specified as:
SSB dB
nv/Root Hz
and Temperature???

Thanks in advance
Paul Breed KL7JG

Date: 19 Jul 94 08:45:49 GMT
From: ihnp4.ucsd.edu!usc!howland.reston.ans.net!noc.near.net!news2.near.net!
news.delphi.com!BIX.com!jdow@network.ucsd.edu
Subject: a High Dymnic range Mixer
To: ham-homebrew@ucsd.edu

paulbreed@aol.com (PaulBreed) writes:

>In my original post I said I wanted any information of IC mixers
>that would be good for use on the HF bands with a preamp.
>(That was I stupid request!!!! On the HF bands Dynamic range is more
>important
>than noise figure!!!! so no preamp.)
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>QST recieveier article.

>Has anyone used the new mixer from analog devices?
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>Is this noise figure of 20dB Good enough for 10 and 15M?

>Also how do you convert from or between noise figures specified as:
>SSB dB
>nv/Root Hz
>and Temperature???

>Thanks in advance
>Paul Breed KL7JG

SSB dB is nonsense salesjargon, IMHO.

nv/Root Hz and temperature are related by the Boltzmann equation.
Essentially noise power = kTB , which at room temperture is about -173.85dBm/Hz.
Once you have that value you can calculate all the other values you want by
playing with absolute temperature ratios and things like power = E^2/R
relations.

The noise temperature of a receiver is related to how much noise you get out of the receiver with a standard "physics class" noiseless source the same impedance as it usually connected. The noise figure is related to the sum of the source resistor noise plus the excess receiver noise divided by the source resistor noise. A noiseless receiver has a VERY low noise temperature and a noise figure very close to unity.

So lemme see here.... $10^{-20.385}$ (to make it watts) $\approx 4 \times 10^{-21} = E^2/50$.

This means $E^2 = 50 \times 4 \times 10^{-21} = 2 \times 10^{-19}$ volts squared. Thus a bare room temp 50 ohm resistor generates about .4nV/Root Hz noise. In a 2400Hz SSB bandwidth this means about .022uV of noise in a 0dB noise figure receiver. In a 3dB NF receiver that'd be maybe .031uV of noise. For all the good that will do.

(I suppose it means you can place a 50 ohm signal generator with attenuators on the receiver input and enjoy a 20dB SNR on a CW signal in the SSB passband with a 0.3uV signal. All of which is meaningless for SSB usage and also meaningless for normal usages on HF. For HF usage with dipoles or gain antennas you want a frequency sensitive attenuator in front of the receiver with perhaps the 3dB corner at 30MHz and attenuation rising about 6dB per octave as the frequency goes down. And even THAT may be underkill in most urban locations. That attenuator will do WONDERS for practical IMD performance on any receiver, by the way.)

{^_^} Joanne Dow, Editor Amiga Exchange, BIX
jdow@bix.com

Date: 18 Jul 94 15:00:00 GMT
From: news-mail-gateway@ucsd.edu
Subject: Dummy Load Oil
To: ham-homebrew@ucsd.edu

In digest 199, Ken (N6MHG) writes:

>What sort of oil is used in the paint can variety of dummy load? I've seen
>an
>article that said mineral oil would work pretty well but was prohibitively
>expensive. While at Wal-mart the other night I checked the prices of their
>mineral oil. \$1.62 per 16oz. bottle. That doesn't seem to be
>prohibitively
>expensive to me at about \$13 for a full gallon. Am I missing something?
>
>Ken Harrison
>N6MHG
>email: harrisok@sonoma.edu

Yes, mineral oil is a little expensive and is probably the safest to use in a dummy load. Don't try anything like motor

oil, it has many different types of lubricants that have different volatility. The 'best' type of oil is "turbine oil." You can get it at many farm and ranch supply stores. One of the easiest to find is sold by TEXACO distributors, Regal Oil R&O Number 46. You can usually find it in 5 gallon cans sold as "turbine oil." I don't know how easy it will be for you to find where you are. Just go out to one of the small towns in your area.

Date: Mon, 18 Jul 1994 16:16:28 GMT
From: spsgate!mogate!newsgate!news@uunet.uu.net
Subject: Dummy Load Oil
To: ham-homebrew@ucsd.edu

I used mineral oil in mine. I got it at K-Mart at about \$1/pint. The check-out person gave me a funny look when I bought 8 bottles. Then I realized what it's often used for (constipation:-).

Be aware that you have to de-rate the dummy load if you use drug-store mineral oil. The transformer oil (be sure it's non-PCB) or the Texaco Turbine Oil is a better choice if you're going to run a lot of power into the dummy load. The Heath Cantenna has different rating curves for the different types of oil. For your basic 100W transceiver, the K-Mart stuff is fine but for tuning your kW linear, get the other stuff.

73... Mark AA7TA

Date: 19 Jul 1994 09:48:57 +0200
From: ihnp4.ucsd.edu!usc!math.ohio-state.edu!howland.reston.ans.net!ee.und.ac.za!ticsa.com!cstatd.cstat.co.za!not-for-mail@network.ucsd.edu
Subject: Dummy Load Oil
To: ham-homebrew@ucsd.edu

In article <2E2A99C0@msmail.uthscsa.edu>, Muenzler, Kevin wrote:
> Yes, mineral oil is a little expensive and is probably the
> safest to use in a dummy load. Don't try anything like motor
> oil, it has many different types of lubricants that have
> different volatility. The 'best' type of oil is "turbine oil."
> You can get it at many farm and ranch supply stores. One of the
> easiest to find is sold by TEXACO distributors, Regal Oil R&O Number
> 46. You can usually find it in 5 gallon cans sold as "turbine oil."
> I don't know how easy it will be for you to find where you are. Just
> go out to one of the small towns in your area.

My experience with dummy loads has shown that the cheapest and most

The oil in the dummy load is ostensibly used for cooling/heat dissipation, and this what the oil in transformers and welders is there for.

Cheerio,

I am glad I don't know everything, that way life isn't boring - Brian Ellse 94

In article <30cr0s\$2an@northshore.ecosoft.com> jls@northshore.ecosoft.com (Jeffery L. Stutzman) writes:

>Thanks,
> Jeff Stutzman (N1LUY)

The classic J-pole design is a monobander. Most trapped multiband verticals, I have had experience with work slightly better than a Cantenna (dummy load). Most monoband verticals (full 1/4 wave or longer) verticals with lots of ground radials (more than 20) have worked well for me. I have not tried the Cushcraft R5 or R7 but these seem to get mixed reviews (rec.radio.amateur.antennas).

73,
C. C. (Clay) Wynn N4A0X
wyn@ornl.gov

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Mark

This is an old rig that was set up for 15KHz channels. I have modified it for 10 Khz spacing with a new crystal, but it needs new

programming for the PLL. Unfortunately, when my new (then) wife and I cleaned up the shack we must have thrown out the repair manual I had for it, so I don't know what the pin outs are on the PLL board.

Thanks in advance

Ray
WD5IFS
mack@mails.imes.com

Date: Mon, 18 Jul 1994 08:53:22 GMT
From: news.Hawaii.Edu!kahuna!jeffrey@ames.arp
Subject: QRP Mail List (was: Building an HW-9: HALP!)
To: ham-homebrew@ucsd.edu

In article <30d70k\$34a@news.u.washington.edu> cummings@u.washington.edu (Mike Cummings) writes:

>

>Also, I keep hearing mention of either a QRP mailing list or newsgroup;
>Could someone direct me there? Thanks!

The QRP email list is a wonderful forum. To subscribe send an email to:
majordomo@think.com

and only write:

subscribe qrp

or:

subscribe qrp-digest

and within a few minutes you'll receive an email from think.com welcoming you to the net. Note that the digest will consist of all the day's articles sent in bulk; otherwise you'll receive each article as a separate email. Expect about 20 articles per day. There's some famous folks on the list - plenty of help available for any problem you might have regarding: antennas, homebrew, kits, and any other qrp-related items.

.73,
Jeff NH6IL

Date: 18 Jul 94 18:32:25 GMT
From: news-mail-gateway@ucsd.edu
Subject: reply to N6MHG
To: ham-homebrew@ucsd.edu

Ken:

On rewinding power transformers: You might look seriously at some of the power toroids for ease of rewinding. I have never tried it but at the local surplus place they usually have several varieties of power toroids. If the secondary is on top of the primary it should be fairly easy to get to the secondaries to rewind them. The other advantage (as these are usually high voltage secondaries) is that you can rewind them with much larger wire with a more manageable number of turns. The biggest problem will probably be getting the old secondary off.

Ray
WD5IFS
mack@mails.imed.com

Date: 18 Jul 94 18:37:30 GMT
From: news-mail-gateway@ucsd.edu
Subject: reply to several
To: ham-homebrew@ucsd.edu

To N6MHG:

Ken:

I am using wal-mart mineral oil in my Heath dummy load. So far it is still 50 ohms and still dissipating energy!

To The chemical thread:

Iso-butane is butane that is "twisted" . It is different from regular butane only in its physical structure. You should be aware that the propellant in a lot of aerosols these days is butane! I believe that this is true for hair spray. That is one reason it burns so well (in addition to the laquer in it).

To Joe Landis:

Why not just remove the preformed contacts from coin cell sockets and modify them for your use. The pressure exerting surface is already what you need!

Ray
WD5IFS
mack@mails.imed.com

Date: 18 Jul 1994 15:05:29 -0400
From: ihnp4.ucsd.edu!swrinde!howland.reston.ans.net!news.intercon.com!
news1.digex.net!digex.net!not-for-mail@network.ucsd.edu
Subject: Rolling my own Transformer (LONG)
To: ham-homebrew@ucsd.edu

>Could someone point me the right direction to finding information about
>"rolling my own" power transformer? Seeing as how I don't really have \$95 to
>plunk down for a transformer and I do have a couple of pretty good surplus
>electronics stores nearby, I was wondering what might be involved with
>purchasing a hefty transformer on a goofy voltage and "playing". I've seen
>some big 'uns down at these stores for much, much less than \$95 (say \$15 - \$20)
>and I'm sure I would have no problem removing their present windings... It
>would give me that much more "home grown" stuff to brag about. :-)
>
>Thanks in advance--
>Ken Harrison
>N6MHG
>email: harrisok@sonoma.edu
>

I have modified transformers at times with good results. Maybe some knowledgeable person can shed more light on the subject. The following relates my experience only. Your mileage may vary 8). All disclaimers apply. I am assuming you have related knowledge and feel competent doing something like that...

Assumptions:

- 0) You are not trying to put together a transformer from scratch!
The most difficult part of doing is finding out about the core material (magnetic properties) which seems impossible to find for an old transformer.
- 1) What you intend to modify, is an ordinary non-saturating core xformer with its primary being fed from an AC outlet (110 and/or 220 volt household supply), and you don't intend to mess with the primary.
- 2) It is not an "autotransformer" - i.e., its primary winding(s) are separate from its secondary winding(s), there is no electrical connection between the two.
- 3) The intent is to vary the secondary voltage *somewhat*, for example , you are not trying to have a 40 volt secondary put out 800 volts. (not only that may be physically impossible for a given geometry, it may have repercussions regarding breakdown voltages, heat

dissipation and such.)

- 4) You *know* the power rating of the transformer's secondary (BTW, I'm theoretically not inclined, or challenged depending on how you look at it.) You know for example that the secondary supplies say 12 volts at 2.5 amps max. (AC, RMS, given Frequency, pure sinusoid, constant phase, etc. etc.)

Opening up a transformer is best left as an exercise for the reader!

If it is dipped in tar(!?), I'd say forget it.

Don't scratch or bend the strips. They are laminated for a reason.

If you pry them off carelessly and damage the lamination/coating or bend them, you are likely to affect the power handling, cause the core to heat up more than it is supposed to, and/or make the xformer "buzz". A practice run on a small low-power transformer maybe worthwhile.

The basic idea is to get what is called "turns per volt" for the secondary (# of turns that give 1 volt at the secondary.) The reverse (i.e., voltage per single turn) will also work but I think is less accurate unless you're in a lab environment.)

It may involve some guessing initially, and the more experience you have, the better your guess will be. Try to estimate, by looking at the secondary winding how many turns it has.

A rough guess is fine. Divide that by the secondary's voltage.

Then wrap *neatly* the number of turns that you calculate, to produce say a couple of volts or so. Another method that's more accurate, is to unwind (a) secondary completely, and count the number of turns, and then do the division. I am almost sure there are some nonlinearities in practice, but for the most part, the relationship is linear and gives a good approximation. If you wrap n turns, you get m volts.

Using the information, you can wrap your experimental winding, preferably for a few volts. Write down your exact # of turns. Then put back the whole thing (carefully). All of the strips should be put back. And the whole thing should be neat and tidy. I have used electrical tape to hold the temporary secondary (experimental) winding. If you left the original secondary winding in place, your experimental secondary could be wrapped on top of it (space permitting). Then connect the primary and measure with a good voltmeter, the voltage of your experimental winding. A high valued resistor as a load on the secondary to draw a few milliamps may be good idea too. Get a second estimate of the turns per volt by dividing the # of turns by voltage. Then, calculate the number of turns you need to wrap for your new secondary (# turns= turns per volt value * desired voltage.) Keep in mind the space limitations for winding extra wire if that's what's needed. Open up the thing again, remove the experimental winding.

If you intend to increase the voltage, you must derate the current the

secondary can supply. Moving too much above or below what the transformer was designed for is in my opinion not a good idea, and it's kind of hard to tell what those limits are when no data is available. Another concern is the space you have for re-wrapping the wire. The most important thing, however, is to keep the power rating of the xformer the same. Example:

Originally: secondary 10 volts, with max current 2.5 amps.

New desired secondary voltage: 17 volts.

$P_{orig} = 10 \times 2.5$ (RMS values) = 25 watts.

(or maybe we should talk about Volt-Amperes instead of watts -:) -:))

New max secondary current = $25 / 17$ = about 1.4 amps.

So at 17 volts you should not expect to draw more than about 1.4 amps.

[This space is left for theoretical gurus. Please go ahead.]

The estimated max current gives you an idea of the wire gauge you need. Use fresh wire of a diameter that can handle the current you need the secondary to supply. Look at tables (for example in the arrl handbook) that show the values for various gauges of copper wire, and be as conservative as possible (i.e., use larger diameter wire - if there is enough space for the whole winding).

footnote: There is an iterative process here if you want to determine the limits, because you can increase the voltage (when not demanding high current) and use thinner wire and that in turn may buy more winding space.) The inverse is also true. (Sometimes there are tables that can be used to estimate how many strands of wire of a given gauge can be put side-by-side in a given cross-sectional area.)

Of course if you intend to lower the voltage, your max current capacity goes up, and if that's what you want, you need larger gauge wire. There is a limit as to how much current can be drawn with a given xformer before saturating the core material, overheating and the associated anomalies. Deviating with a few percent of the rating may be ok.

Wrap the winding tight and with care, so as *not to nick the lamination of the wire*. Put Q-dope or use a good quality insulating varnish over each layer. For higher voltages, it is essential to use a varnish with high dielectric properties (high breakdown voltage) or else one layer may arc over to another. You may even have to have "varnished paper" insulation between layers. Put back the final wrapping insulating "papers", etc. BTW: can someone point to a source of that paper/wrapping material ?

After a couple of times, you can skip the trial winding too. I usually wrap a few more turns, put the thing together, measure the voltage, and trim as necessary before finishing up.

All comments and corrections welcome - I don't rewind transformers that often!!!

** Be careful and use applicable precautions and good judgment when around lethal voltages (or should I say currents,... or power -:)) **

Good Luck,

/siamack

--

Siamack Navabpour sia@access.digex.net
73 de wjlq

"He who bends to himself a joy, Will the winged life destroy
But he who kisses the joy as it flies, Will live in eternity's sunrise"
-- Willy Shakespeare

Date: Mon, 18 Jul 1994 13:49:29 GMT
From: ihnp4.ucsd.edu!swrinde!emory!rsiatl!ke4zv!gary@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <1994Jul15.123344.23544@arrl.org>,
<1994Jul16.143641.21737@ke4zv.atl.ga.us>, <1994Jul17.142908.2163@arrl.org>
Reply-To : gary@ke4zv.atl.ga.us (Gary Coffman)
Subject : Re: RSGB BOOK

In article <1994Jul17.142908.2163@arrl.org> zlau@arrl.org (Zack Lau (KH6CP))
writes:

>Gary Coffman KE4ZV (gary@ke4zv.atl.ga.us) wrote:

>

>: While I agree that the general literacy level in this country is
>: low, bad writing is not so much the technical innovator's fault
>: as it is the technical *editor's* fault. It's his job to work with
>: the author to put the manuscript into a coherent and literate form.

>

>But, what if there is *no* technical editor? One of the best places
>to find out about the latest innovative projects is conference
>proceedings, which don't have the lead times associated with
>editing.

Then we suffer through the bad writing. That's a different thing
than the Handbooks we were discussing where there *is* an editor
responsible for the book.

Note I'm not trying to slam ARRL book editors here. It's a thankless enough job already. I suspect that the ARRL editors are no less skilled than their RSGB counterparts, but the raw material they have to work with may be less polished.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

End of Ham-Homebrew Digest V94 #201
